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(54) Method of disinfecting seed

(57) The invention relates to a method of disinfecting seed, wherein the seed is treated with ozonic gas. Preferably the seed is treated while it is dry and at ambient temperature. It is especially favourable if the seed previous to treatment is placed into vacuum, usually for

2-40, the vacuum pressure generally being 2-40 mm Hg. As a rule the ozonic gas is air. The ozonic gas contains per litre 100-200 p.p.m. of ozone. Treatment with the ozonic gas lasts 2-40 minutes. It is also possible to treat the seed with the ozonic gas while it is suspended in water.

Description

[0001] The present invention relates to a method of disinfecting seeds.

[0002] It is generally known that seeds readily become infected with bacteria and/or viruses, which has the unfavourable effect that the vitality of the seeds can deteriorate, which may lead to a diminishing germination power of the seeds. One thing and another results in a relatively large percentage of seeds not germinating after sowing, involving a not inconsiderable loss.

[0003] If one takes into consideration that some seeds, for instance tomato seeds, are very expensive, costing per kilo approximately 10,000 guilders, it becomes obvious that it is of the utmost importance to ensure that the sown seed will germinate optimally.

[0004] Although agricultural seed such as wheat, maize, etc. is less expensive per kilo, the economic aspects also play an important role because of the large quantities in which such seeds are used. Another important factor with precision sowing is that all seeds must germinate, since otherwise the sown ground will become irregular, which is undesirable.

[0005] It is therefore of great importance that the seed is sterilized before sowing. According to the standard technique this is done by means of either liquid or solid chemical sterilizing agents. Another known method is to pill the seeds, whereby the seed is first contacted with a solution or suspension of sterilizing agent and the liquid is subsequently evaporated. The seed thus obtained is pilled, that is to say it is provided with a shell. However, it is also possible to incorporate the sterilizing agent in the material of the shell.

[0006] The pilling technique was in fact developed for precision sowing of small seed, such as tomato, celery, etc.

[0007] It has been shown that the germinating power of the seed decreases when the seed has previously been treated with liquid containing sterilizing agent.

[0008] It is now the object of the invention to provide a method of sterilizing seed, wherein after sterilization of the seed the germination power is completely maintained.

[0009] To this end the invention provides a method of sterilizing seeds, characterized in that the seed is treated with ozonic gas.

[0010] Surprisingly, it has been shown that after treating the seed with ozonic gas according to the invention, the germination power remains practically entirely intact, which means, that practically all the sown seed germinates.

[0011] Particularly good results were obtained when the seed was treated with ozonic gas while dry.

[0012] According to the invention, it is preferred to treat the seed with ozonic gas at ambient temperature.

[0013] Surprisingly, it has been shown that better sterilization results are obtained when the seed, previous to treatment with ozonic gas, is placed into vacuum.

[0014] Due to the vacuum, the air is removed from the pores of the seed, allowing the ozone to penetrate into the pores of the seed where it can exercise its sterilizing activity. This is particularly important because, as is known, ozone is only active for a relatively short period of time.

[0015] According to the invention, the vacuum is usually maintained 2 to 40 minutes, at a vacuum pressure of 2 to 40 mm Hg. Subsequent to interrupting the vacuum, the seed is brought to atmospheric pressure with the ozonic gas.

[0016] Usually one uses air as the ozonic gas.

[0017] Preferably the gas contains per litre 100 to 2000 p.p.m. of ozone

[0018] If ozone concentrations considerably higher than 2000 p.p.m./l are used, the seed will burn.

[0019] The treatment of the seed with the ozonic gas usually lasts 20-40 minutes.

[0020] However, previous to treating the seed with ozonic gas, it is also possible to first suspend the seed in water and subsequently to feed the ozonic gas into the suspension.

[0021] To obtain the ozonic gas, use was made of a standard ozone generator. This handy device, measuring 40 x 40 x 20 cm, has a maximum power consumption of 50 W at 220 V and 50-60 Hz, and a maximum ozone production of 0.65 g O₃/h at an airflow of 700 l/h. As the experiment was carried out on a smaller scale, the air flow through the ozonizer during the experiments was limited to 50 l/h. In the experiment below, in which use was made of an air flow through the ozonizer of 50 l/h, the seed was introduced into a vacuum vessel, where it was maintained under vacuum for approximately 30 minutes. Subsequently the vacuum vessel was brought to atmospheric pressure with the thus produced ozonic air.

[0022] The invention will now be elucidated with reference to the following non-limitative example.

40 Example

[0023] In accordance with the invention, seed infected with bacteria was treated in a 500 ml Erlenmeyer with the ozonic air containing 1000 p.p.m. of ozone. The treatment lasted 15 minutes. When the thus treated seeds were examined, the bacteria were shown to be dead.

50 Claims

1. A method of disinfecting seeds, characterized in that the seed is treated with ozonic gas.

55 2. A method according to claim 1, characterized in that the seed is treated with ozonic gas while it is dry.

3. A method according to claim 1 or 2, **characterized** in that the seed is treated at ambient temperature.
4. A method according to claims 1-3, **characterized** in that the seed previous to treatment is placed into **5** vacuum.
5. A method according to claim 4, **characterized** in that the seed is maintained under vacuum for 2-40 **10** minutes.
6. A method according to claim 5, **characterized** in that the vacuum pressure is 2-40 mm Hg.
7. A method according to claims 1-6, **characterized** **15** in that the ozonic gas is air.
8. A method according to claim 7, **characterized** in that the gas contains per litre 100-200 p.p.m. of ozone. **20**
9. A method according to claims 1-8, **characterized** in that the seed is treated with the ozonic gas for 2-40 minutes. **25**
10. A method according to claim 1, **characterized** in that treatment with the ozonic gas is carried out while the seed is suspended in water.

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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 655 (C-1136), 6 December 1993 (1993-12-06) & JP 05 211808 A (JAPAN STEEL WORKS LTD:THE), 24 August 1993 (1993-08-24) * abstract *	1,3,9,10	A01C1/08
X	WO 95 09523 A (GOEMAR LAB SA ;DEGREMONT (FR); YVIN JEAN CLAUDE (FR); COSTE CHRIST) 13 April 1995 (1995-04-13) * claims *	1,9	
A	DATABASE WPI Section PQ, Week 198604 Derwent Publications Ltd., London, GB; Class P11, AN 1986-027273 XP002119718 & SU 1 166 693 A (GRODNO AGRIC INST), 15 July 1985 (1985-07-15) * abstract *	4-8	
A	US 4 376 130 A (ASTRACK ALEXANDER ET AL) 8 March 1983 (1983-03-08) * column 4; examples 1,2 *	1,9,10	
A	FR 2 643 790 A (LECLAIR GILLES) 7 September 1990 (1990-09-07) * claims *	7-10	
		4	TECHNICAL FIELDS SEARCHED (Int.Cl.)
			A01C
<p>The present search report has been drawn up for all claims</p>			
Place of search THE HAGUE	Date of completion of the search 19 November 2001	Examiner Hinrichs, W	
CATEGORY OF CITED DOCUMENTS			
<p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p>			
<p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-11-2001

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
JP 05211808	A	24-08-1993	JP	2101337 C	22-10-1996
			JP	8004409 B	24-01-1996
WO 9509523	A	13-04-1995	FR	2710812 A1	14-04-1995
			AU	7816694 A	01-05-1995
			BR	9407750 A	12-02-1997
			CA	2173337 A1	13-04-1995
			CN	1132466 A ,B	02-10-1996
			DE	69417756 D1	12-05-1999
			DE	69417756 T2	07-10-1999
			EP	0722265 A1	24-07-1996
			ES	2133580 T3	16-09-1999
			WO	9509523 A1	13-04-1995
			JP	9510081 T	14-10-1997
			US	5703009 A	30-12-1997
SU 1166693	A	15-07-1985	SU	1166693 A1	15-07-1985
US 4376130	A	08-03-1983	NONE		
FR 2643790	A	07-09-1990	FR	2643790 A1	07-09-1990